



Electronic Organ Circuits

MM5823, MM5824 frequency dividers

general description

These frequency dividers provide six stages of binary division to produce six octave-related outputs of an electronic musical instrument tone generator. Each divider stage consists of an asynchronous, dc-coupled flip-flop.

The six stages of the MM5823 are internally connected in cascades of two, one, one, and two flip-flops. Each flip-flop drives a push-pull output buffer which provides very low output impedance in both logic states.

The six stages of the MM5824 are internally connected in cascades of one, two and three flip-flops. Each flip-flop drives a push-pull output buffer which provides very low output impedance in both logic states. Two of the internal cascades also provide trigger outputs for use in cascading the divider stages.

The timing diagram shown results from connecting the same input trigger to all three inputs.

The MM5823 and MM5824 complement the MM5832, MM5833 and MM5555, MM5556 chromatic frequency generators; output characteristics and power supply requirements are compatible. The MM5823 and MM5824 are packaged in a 14-lead dual-in-line package.

features

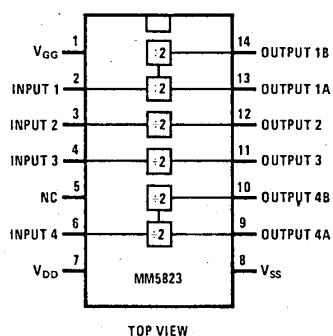
- 0 to 100 kHz toggle frequency
- 1, 2, 3 or 2, 1, 1, 2 stage partitioning

applications

- Electronic organs
- Electronic music synthesizers
- Musical instrument tuners

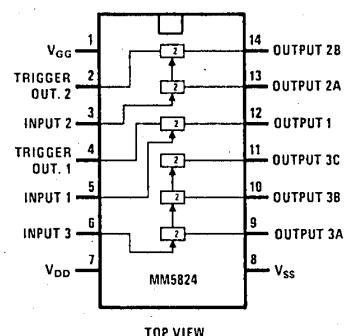
connection diagrams

Dual-In-Line Package



Order Number MM5823N
See Package 18

Dual-In-Line Package



Order Number MM5824N
See Package 18

absolute maximum ratings

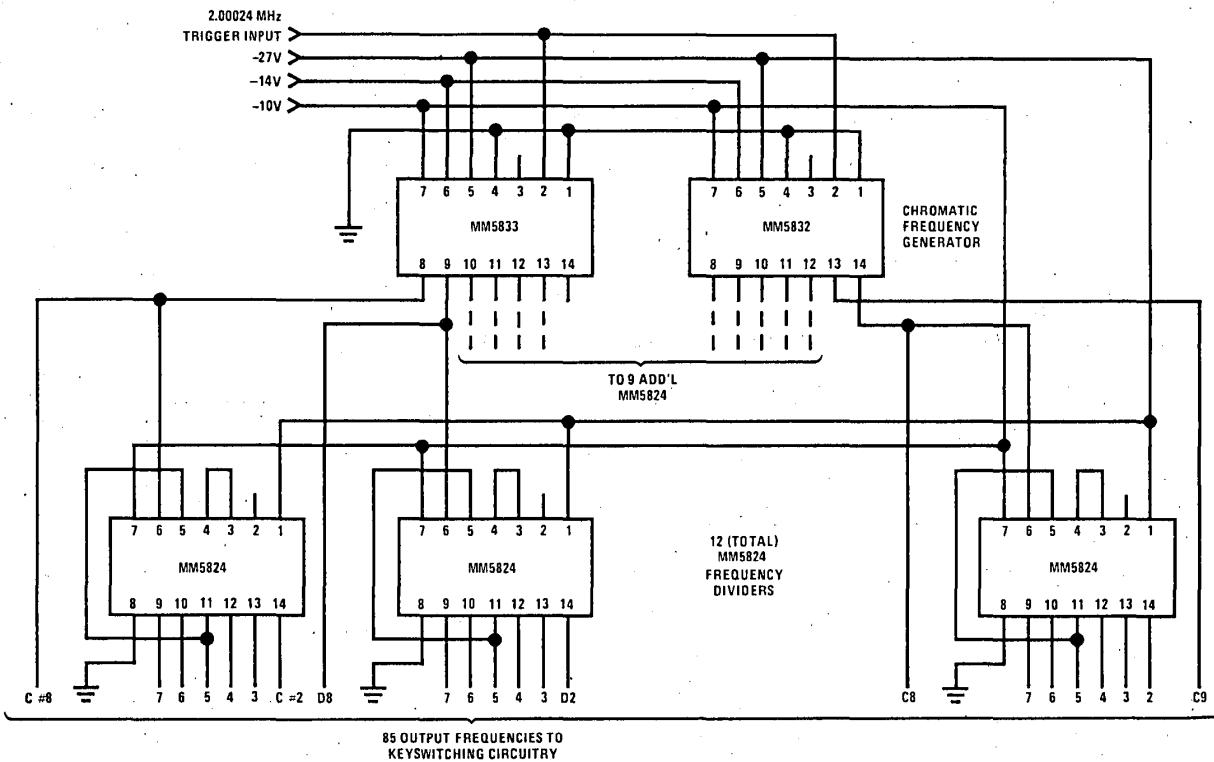
| | |
|------------------------------------|-----------------|
| Logic Supply Voltage (V_{GG}) | 0.3V to -30V |
| Buffer Supply Voltage (V_{DD}) | 0.3V to -18V |
| Trigger Input Voltage (V_{IT}) | 0.3V to -25V |
| Power Dissipation (P_D) | 250 mW |
| Storage Temperature (T_S) | -55°C to +150°C |
| Operating Temperature (T_A) | 0°C to +70°C |

electrical characteristics

T_A within operating range ($V_{GG} = -27 \pm 1V$, $V_{DD} = -11.5 \pm 0.5V$, $V_{SS} = 0V$), unless otherwise noted.

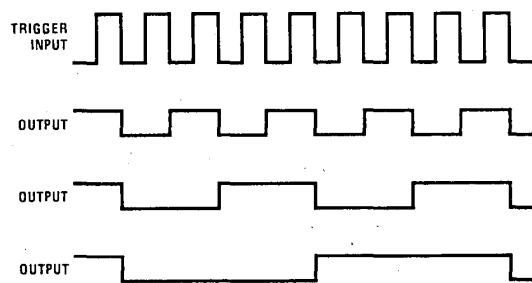
| PARAMETER | MIN | TYP | MAX | UNITS |
|---|----------------|----------|----------------|-------|
| Inputs: | | | | |
| Frequency (f_{IT}) | DC | | 100 | kHz |
| Rise and Fall Times (10% to 90%) (t_r, t_f) | | | 25 | μs |
| Pulse Width (at 90%) (pw) | 2 | | | μs |
| Logical High Level (V_{ITH}) | -2.0 | V_{SS} | 0.3 | V |
| Logical Low Level (V_{ITL}) | -18 | -10 | -8.0 | V |
| Leakage Current @ $V_{ITL} = -18V$ (I_{ITL}) | | | 1.0 | μA |
| Trigger Outputs: (loaded 10M ohm to ground, $T_A = 25^\circ C$) | | | | |
| Logical High Level (V_{OTH}) | $V_{SS} - 1.5$ | | V_{SS} | V |
| Logical Low Level (V_{OTL}) | -18 | | -10 | V |
| Outputs: (loaded 10k ohm to ground and 10k ohm to V_{DD} , $T_A = 25^\circ C$) | | | | |
| Logical High Level (V_{OH}) | -0.5 | | -0.3 | V |
| Logical Low Level (V_{OL}) | $V_{DD} + 0.3$ | | $V_{DD} + 0.5$ | V |
| Supply Currents: (No output loads, $T_A = 25^\circ C$) | | | | |
| Logic Supply (I_{GG}) | | 2.0 | 8.0 | mA |
| Buffer Supply (I_{DD}) | | | 20 | μA |

typical application



Typical Organ Tone Generator

timing diagram





Electronic Organ Circuits

MM5832, MM5833 chromatic frequency generator

general description

The National Semiconductor MM5832, MM5833 chromatic frequency generator is an MOS/LSI frequency synthesizer designed to generate musical frequencies. The circuits provide thirteen semi-tone outputs, fully spanning the equal tempered octave. The divisors have been carefully selected to offer excellent tuning accuracy. Output characteristics are fully compatible with the MM5554, MM5823 and MM5824 Frequency Dividers. The MM5832 or MM5833 is packaged in a 14-lead dual-in-line package.

features

- Single-phase squarewave input

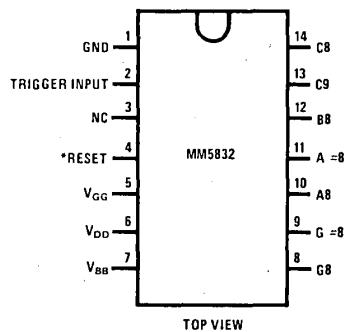
- 7 kHz to 2.1 MHz input frequency
- Maximum error of 1.16 cent

applications

- Celeste tone generator
- Electronic music synthesizers
- Organ tone generators
- Chorus tone generators

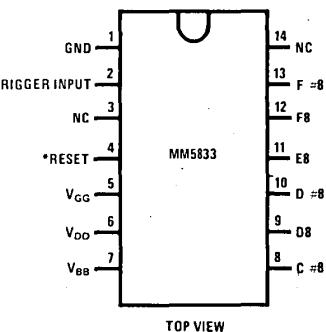
connection diagrams

Dual-In-Line Package



Order Number MM5832N
See Package 18

Dual-In-Line Package



Order Number MM5833N
See Package 18